WASHINGTON SINGLE-FAMILY HOMES

State Summary Statistics

2014
Full RBSA Dataset: *http://bit.ly/1rTVSjg*
neea.org

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EXECUTIVE SUMMARY

The purpose of this report is to provide a summary of Washington's single-family home energy use based on the Northwest Energy Efficiency Alliance's (NEEA) 2011 Residential Building Stock Assessment (RBSA) findings. It is accompanied by three other state-specific reports for Idaho, Montana and Oregon. Each state-specific report includes overall housing utility and energy statistics, and details the type and efficiency of housing components including windows, insulation, appliances and heating fuel types within each region of each state. The state-specific report findings are largely from the 2011 RBSA study, except where supplemental data sources have been noted.

The RBSA is sponsored by NEEA and was conducted by Ecotope, Inc. with support by Ecova™, Delta-T, Inc., and ORC International. The primary objective of the RBSA is to develop an inventory and profile of the Northwest's existing residential building stock based on field data from a representative, random sample of existing homes. The RBSA establishes the 2011 regional housing stock baseline for three residence categories: single-family homes, manufactured homes, and multi-family homes.

The results will guide future planning efforts and provide a solid base for assessing residential program energy savings throughout the Northwest. Ecotope designed the RBSA sample to include all public and investor-owned utilities in Idaho, western Montana, Oregon and Washington. The final RBSA sample included 99 utilities: 89 public utilities, seven investor-owned utilities, and three natural gas-only utilities. Field surveys were conducted on more than 1,850 sites across the Northwest, including more than 1,400 single-family homes.

The regional single-family, manufactured, and multi-family homes RBSA reports, and other state-specific single-family summary reports are available on NEEA's RBSA website. Also on the website is the RBSA Metering study, which studied 101 sites from the single-family home sample with a full set of instruments designed to assess electric and other energy uses across a variety of residential end uses.

Any questions or comments can be directed to Aaron James or the Market Research and Evaluation department at NEEA.

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The Northwest Energy Efficiency Alliance (NEEA) is an alliance of more than 140 Northwest utilities and energy efficiency organizations working on behalf of more than 13 million energy consumers. NEEA leverages its strong regional partnerships to effect market transformation by accelerating the adoption of energy-efficient products, services and practices.

Note: All RBSA data used in this report is weighted. The initial RBSA reports only have raw, un-weighted numbers so in some cases this will result in different numbers being reported.

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QUICK DEMOGRAPHIC OVERVIEW

As of 2012, the state of Washington had an estimated population of 6.9 million – making up 51 percent of the Pacific Northwest (13.4 million). Between 2010 and 2012, Washington grew more quickly - at 3.70 percent - than the rest of the region (2.85 percent), and the rest of the United States (1.70 percent). Washington had 2.9 million housing units with 2.6 million households. More than 10 percent of Washington's housing units are second homes and/or vacant, compared to 13.3 percent nationwide. Washington has 2.52 persons per household compared to 2.61 nationally. The median value of owner-occupied housing units in Washington is $272,900, and the median household income is $59,374, compared to $181,400 and $53,046 respectively nationwide. The majority of Washington's population is concentrated within about 50 miles of Interstate 5.

People Quick Facts[1]	Washington	REGION	USA
Population, 2012 estimate	6,895,318	13,395,755	313,873,685
Population, percent change, April 1, 2010 to July 1, 2012	+3.70%	+2.85%	+1.70%
Language other than English spoken at home, percent of persons age 5+, 2007-2011	18.20%	15.20%	20.50%
Mean travel time to work (minutes), workers age 16+, 2008-2012	25.50	23.36	25.40
Housing units, 2012	2,914,607	5,757,995	132,452,405
Homeownership rate, 2008-2012	63.80%	64.70%	66.10%
Housing units in multi-unit structures, percent, 2008-2012	25.70%	24.03%	25.90%
Median value of owner-occupied housing units, 2008-2012	$272,900.00	$247,641.00	$181,400.00
Households, 2008-2012	2,619,995	5,112,705	115,226,802
Persons per household, 2008-2012	2.52	2.51	2.61
Per capita money income in the past 12 months (2011 dollars), 2008-2012	$30,661.00	$28,080.00	$28,051.00
Median household income, 2008-2012	$59,374.00	$54,085.00	$53,046.00
Persons below poverty level, percent, 2008-2012	12.90%	13.86%	14.90%

[1]Staff, "State & County QuickFacts." US Census Bureau Website. U.S. Department of Commerce, 28 May 2014. Web. 27 Mar 2014. < http://quickfacts.census.gov/qfd/states/53000.html >.

UTILITY AND ENERGY STATISTICS[2]

There are 3.2 million utility customers in Washington, 2.85 million of which are residential accounts. Residential customers in Washington account for 4,079 average megawatts (aMW) of demand and 35 million megawatt hours (MWh) of usage. More than 55 percent of residential customers in Washington (representing 58 percent of annual usage) are with Cooperatives, Municipalities, or Public Utility Districts. Investor Owned Utilities customers in Washington pay 28 percent more per kilowatt-hour (kWh) than other utility types, but use about 14 percent less kWh per month.

Customers by Utility Type (2012)	Cooperatives	Municipalities	Public Utility Districts	Investor Owned Utilities	BPA	Total
Residential	141,165	572,208	861,085	1,278,302	-	2,852,760
Commercial & Industrial	23,135	69,915	115,136	175,505	9	383,700
Public Street & Highway Lighting	-	-	-	-	-	-
Other Public Authorities/ Transportation	-	5	-	1	-	6
Other Sales to Retail Energy Customers	-	-	-	-	-	-
Total Customers	**164,300**	**642,128**	**976,221**	**1,453,808**	**9**	**3,236,466**
Residential Electricity Costs	**Cooperatives**	**Municipalities**	**Public Utility Districts**	**Investor Owned Utilities**	**BPA**	**Total**
Average Cost per kWh	7.84¢	7.62¢	7.82¢	9.91¢	-	8.53¢
Average Monthly Cost	$101.44	$65.31	$95.42	$96.32	-	$88.48
Average Annual Cost	$1,400.43	$927.71	$1,320.82	$1,052.02	-	$1,122.80
Average Monthly kWh	1,294	857	1,220	972	-	1,037
Average Annual kWh	15,526	10,285	14,643	11,663	-	12,448
Total Annual MWh	2,191,697	6,083,474	12,326,735	14,909,055	-	35,510,961
Total Annual aMW	252	699	1,416	1,713	-	4,079

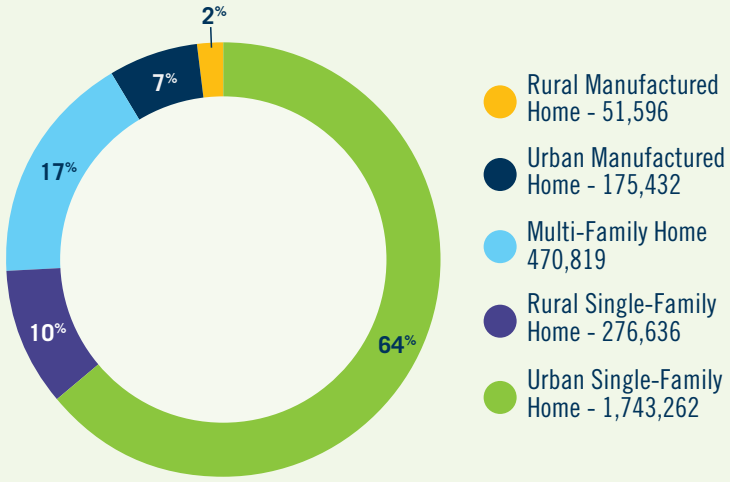
[2]Energy Information Administration- *EIA.gov*

HOUSING FACTS
Location

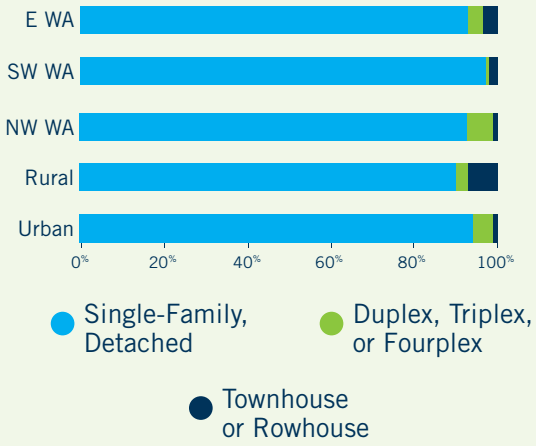
Sixty-six percent of housing units in Washington are Single-Family homes; most of those are in 'urban' counties[3] (86 percent). Nearly all Single-Family homes are detached, with less than seven percent being either townhouse/rowhouses or duplex/triplex/quadplexes.

Overall, housing in urban counties tends to be older than rural counties, with 46 percent being built before 1969 and an average age of 44 years. Only 33 percent of homes in rural counties were built before 1969, and their average age is 41 years. Urban homes tend to be slightly larger (2,051 ft^2 vs. 1,887 ft^2) - seemingly the result of having one more room per house on average (13.5 vs. 12.4 rooms per house). Both rural and urban homes average 152 ft^2 per room.

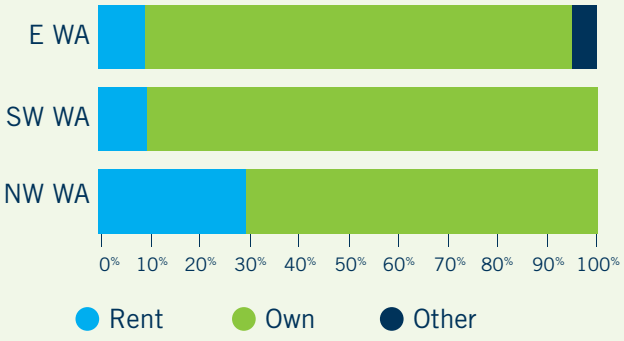
Housing Type



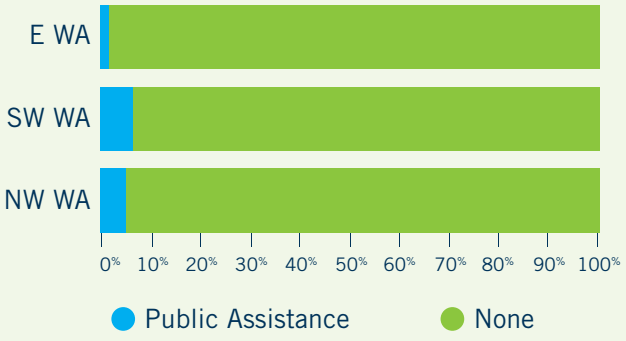
Single-Family Homes
(by Type and Region)



Rent/Own
(by Region)

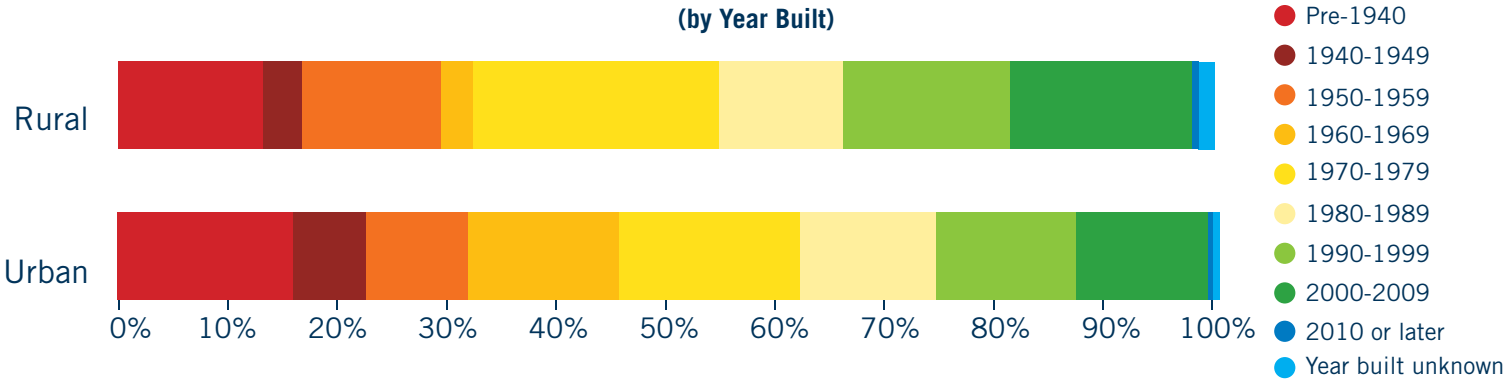


Public Assistance
(by Region)

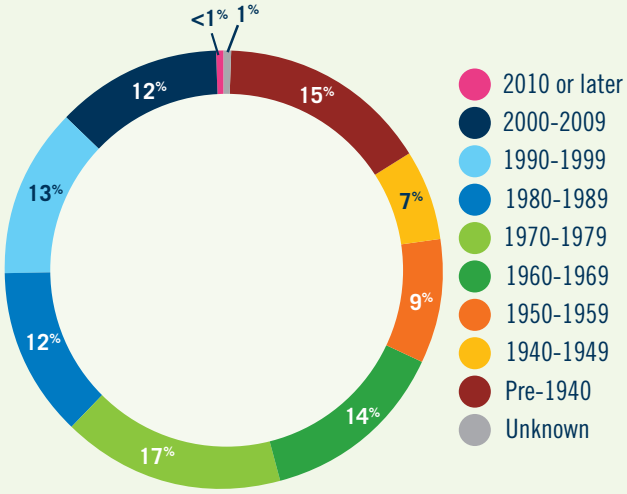


[3]Urban/Rural is based on the 2013 USDA Rural-Urban Continuum Codes with those counties in codes 1-3 considered to be Urban and all others considered to be Rural. http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx

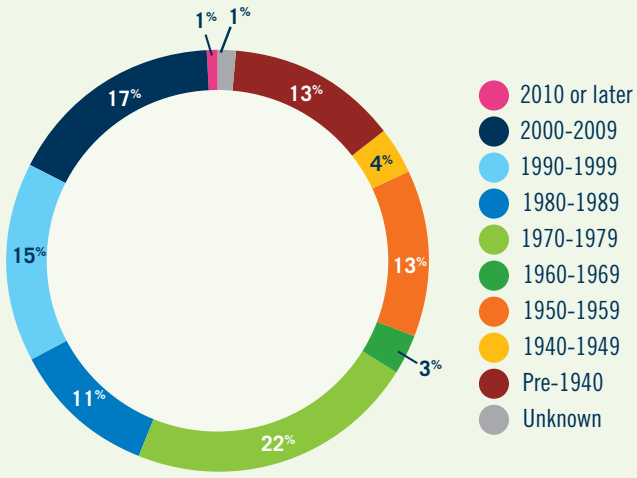
Single-Family Home
(by Year Built)



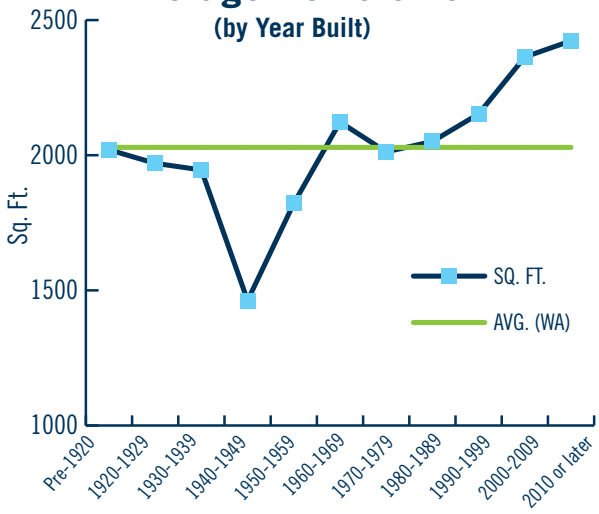
Urban Single-Family Home
(Year Built)



Rural Single-Family Home
(Year Built)



Average Home Size
(by Year Built)



Single-Family Home Statistics

	Avg. Age (Years)	Avg. Square Feet	Avg. # Rooms	Avg. # of Floors
Urban	44	2,051	13.5	1.3
Rural	41	1,887	12.4	1.3
Washington	44	2,029	13.3	1.3

TYPICAL HOUSE BY REGION[4]

Eastern Washington

Built in 1975/Moved in: 1999
2,206 ft²--3.4 Bedrooms/2.2 Bath
1.3 floors, 13.7 rooms

Heating:
Gas Forced Air Heat (1998)
or Electric Baseboard

Refrigerator:
20 ft³/Built in 1999

Air Conditioning (AC):
65% have AC
Most Common: Central AC (52%)

Television:
Primary: 38"- 2006 (On for 7.5 hrs daily)
Secondary: 28"- 2004

Water Heater:
52g Electric/Built in 2000

Washer:
Top-Load-2001
Dryer:
Electric-2001

NW Washington

Built in 1964/Moved in: 1997
2001 ft²--3.1 Bedrooms/2.2 Bath
1.4 floors, 13.4 rooms

Heating:
Gas Forced Air Heat (2000)

Refrigerator:
20 ft³/Built in 2000

Air Conditioning (AC)
20% have AC
Most Common: Heat Pump (42%)

Television:
Primary: 37"- 2005 (On for 5.5 hrs daily)
Secondary: 29"- 2004

Water Heater:
49g Gas/Built in 2003 or
52g Electric/Built in 2003

Washer:
Top-Load-1999
Dryer:
Electric-2001

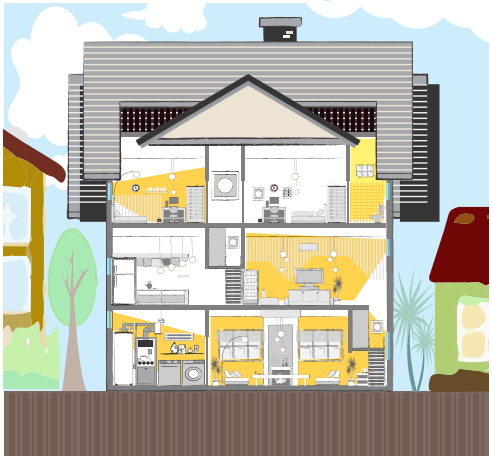
SW Washington

Built in 1975/Moved in: 1999
1866 ft²--3.1 Bedrooms/2.1 Bath
1.3 floors, 12.3 rooms

Heating:
Electric Baseboard Heat

Refrigerator:
20 ft³/Built in 2000

Air Conditioning (AC):
40% have AC
Most Common: Heat Pump (53%)



Television:
Primary: 36"- 2005 (On for 6 hrs daily)
Secondary: 28"- 2003

Water Heater:
53g Electric/Built in 2000

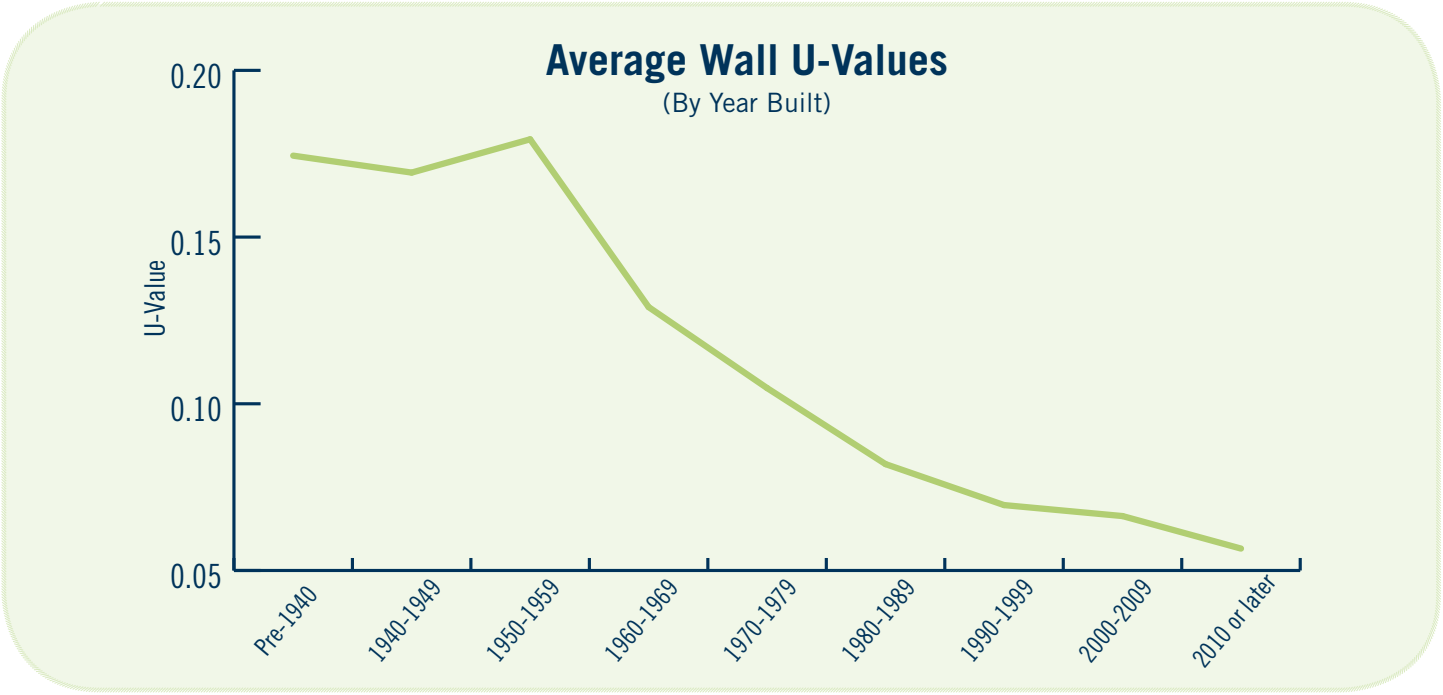
Washer:
Top-Load-2000
Dryer:
Electric-2001

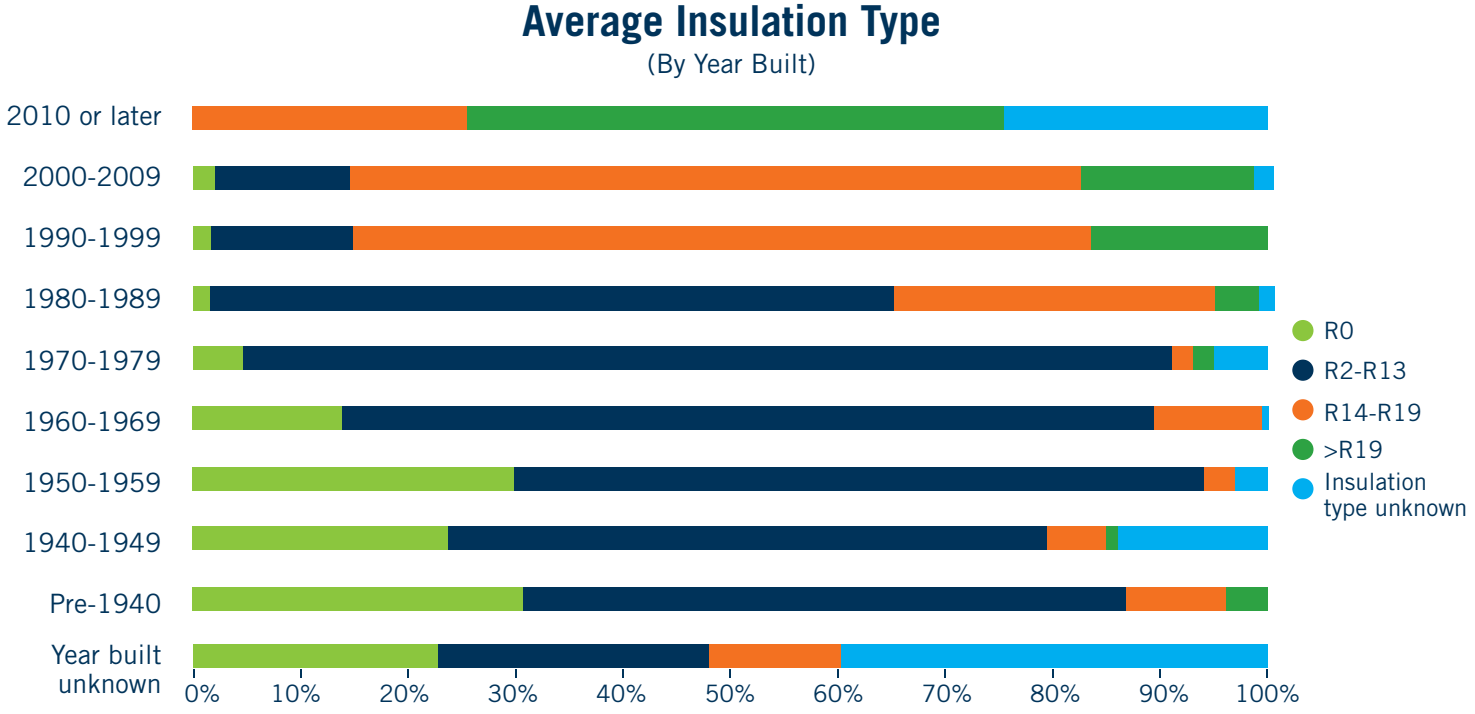
[4]There were 736 total observations in Washington.
The Northwest Region includes all counties west of the Cascades from around Puget Sound and includes 443 observations.
The Southwest Region includes all counties west of the Cascades south of Puget Sound and includes 167 observations.
The East Region includes all counties east of the Cascades and includes 126 observations.

INSULATION

The average U-value for walls, which describes how well a building element conducts heat, has decreased significantly, from 0.17 to 0.18 before the 1950s, to an average of 0.06 for houses built since 2010 – as building codes have required better wall insulation.

Houses built prior to 1989 had lower R-values. R-value is a measure of thermal resistance and is expressed as the thickness of the material (U-value is the inverse of R-value). Houses built prior to 1989 had insulation of less than R-13, though some have since been upgraded. About half of all houses built since 2010 have insulation of R-19 or better.

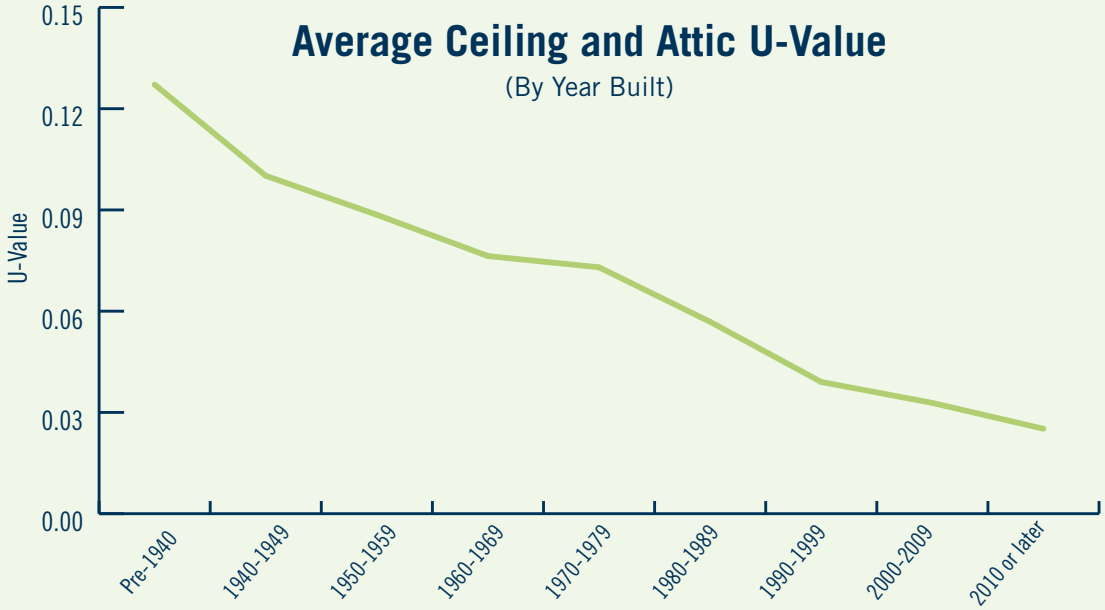


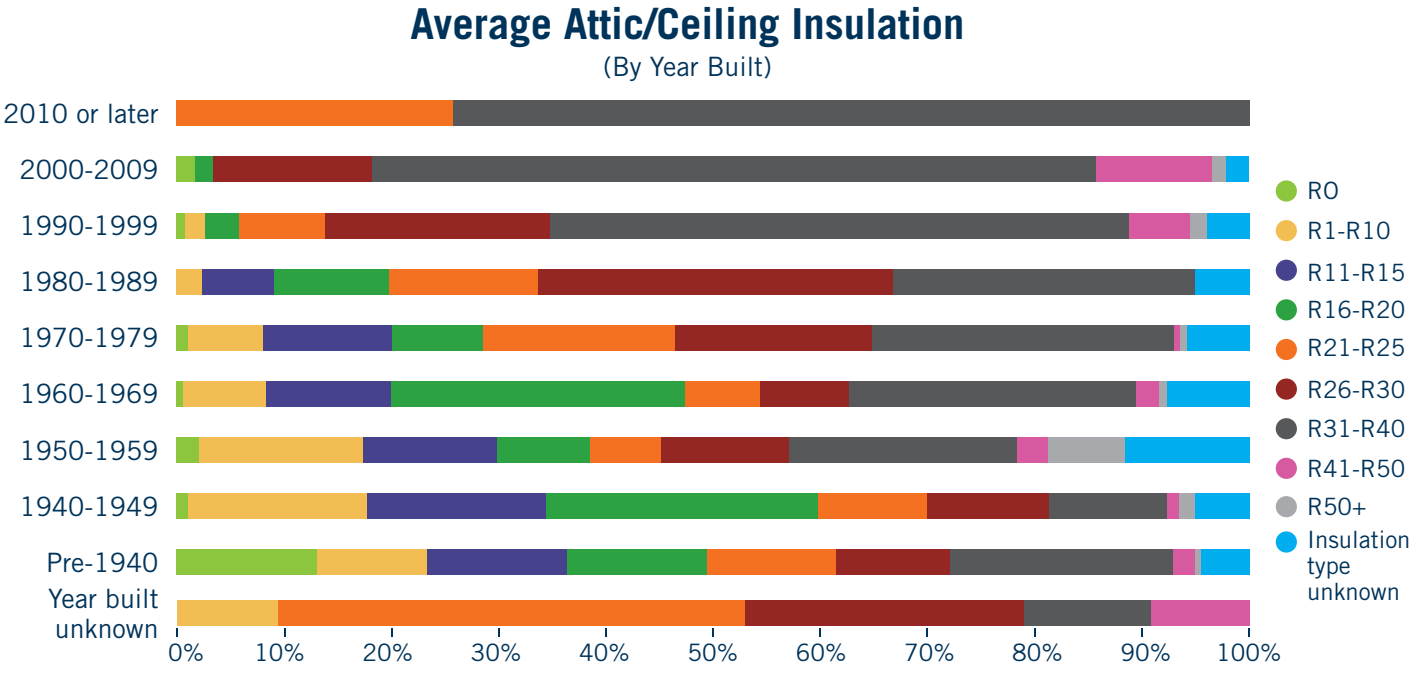


CEILINGS AND ATTICS/ FLOORS

As with walls, the average U-value for ceilings has dropped significantly as building codes have increased ceiling insulation requirements. While many older houses have since been upgraded, a significant proportion of houses built prior to the first building codes in 1970 had floor insulation of less than R-20, with many as low as R-0. Houses built after 1970 have significantly better ceiling/attic insulation. More than 80 percent of houses built in the 1990s have ceiling/attic insulation of at least R-26, with a growing number at R-50 or better.

While floor insulation has likely seen similar trends, surveyors were only able to collect data on a small percentage of homes in the RBSA study, so similar statistics are not available.

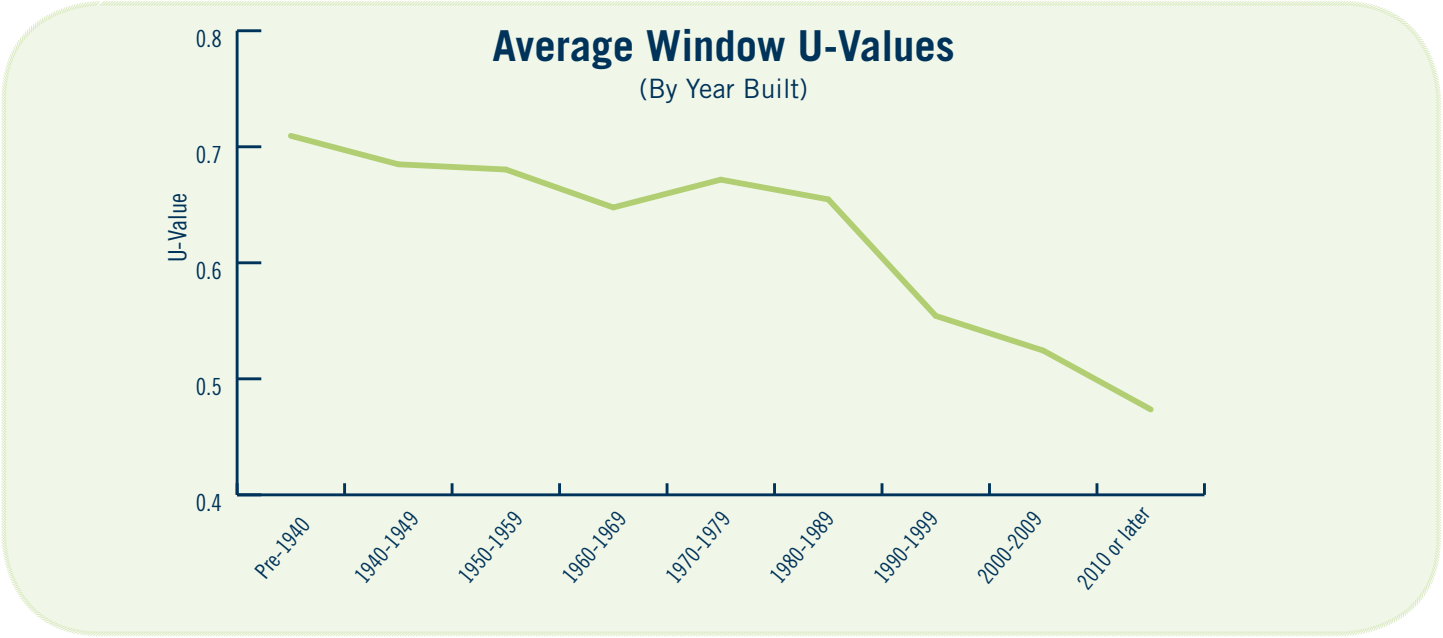


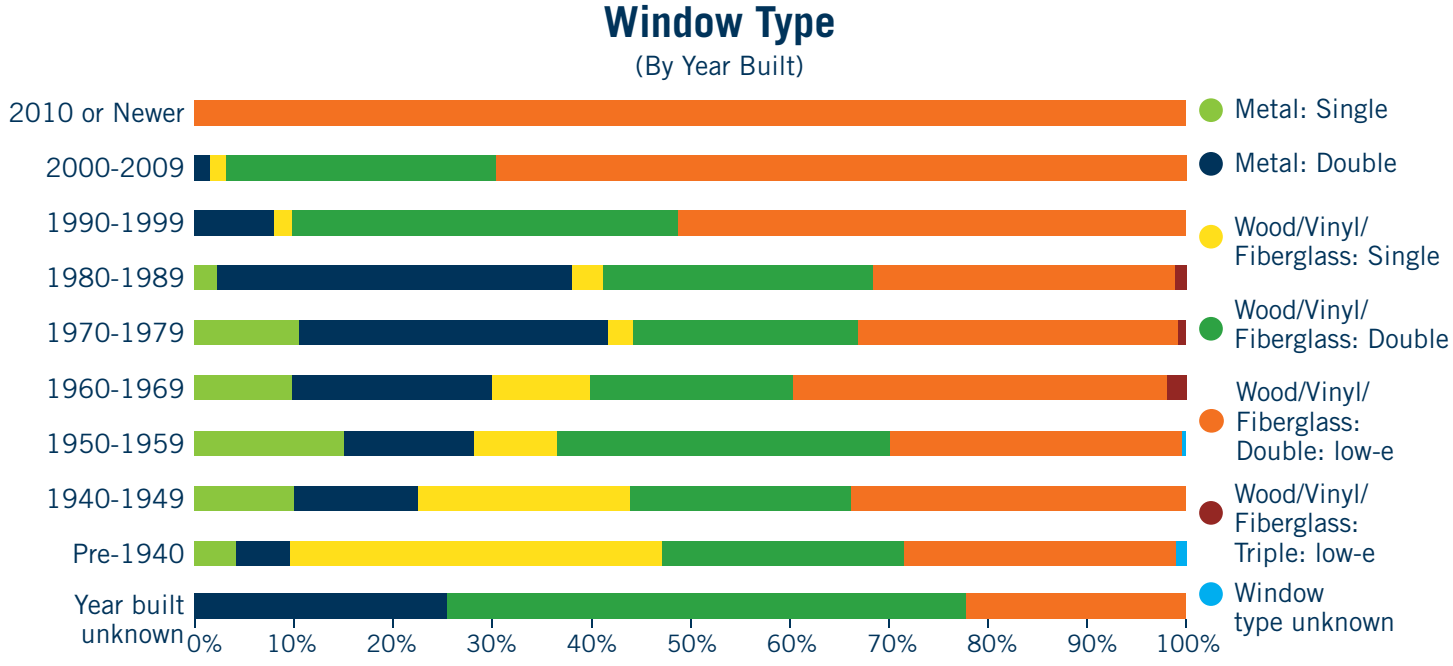


WINDOWS

Prior to the 1970s, most houses were built with wood, and later, aluminum, single-pane windows. Building codes and new technologies brought in double-pane, insulated windows, and vinyl and fiberglass frames, significantly dropping window U-values. While many windows in homes built before the 1970s have subsequently been improved, average total U-values have nonetheless dropped significantly since building codes were introduced. The average U-value for homes built prior to the 1940s is 0.71, while windows in houses built since 2010 are averaging about 0.47.

Nearly all windows since the mid-90s are low-e insulated double-panes, with wood/vinyl/fiberglass frames. Some triple-pane windows are also making their way into the market.



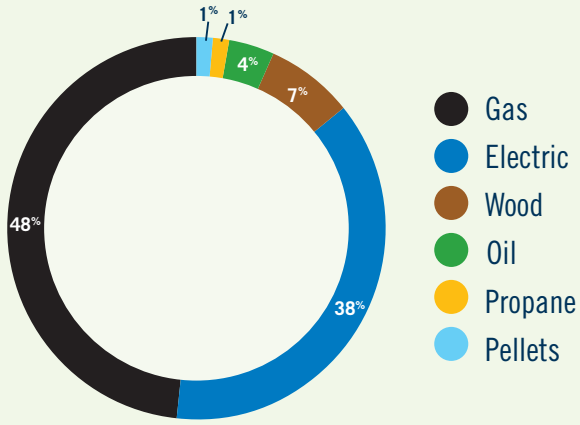


HEATING

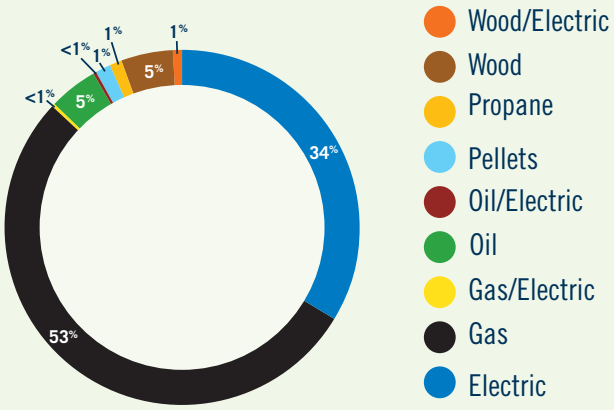
The most prevalent heating fuel for Single-Family homes in Washington is gas (48 percent) followed by electric heat (38 percent). In urban counties, gas is much more prevalent, with 53 percent of all homes using gas heat and 34 percent using electric. Though more diverse in their heating, rural counties are still dominated by electric heat (61 percent), and more homes use wood heat (19 percent), compared to those using gas heat (15 percent).

State Heating Fuel Type

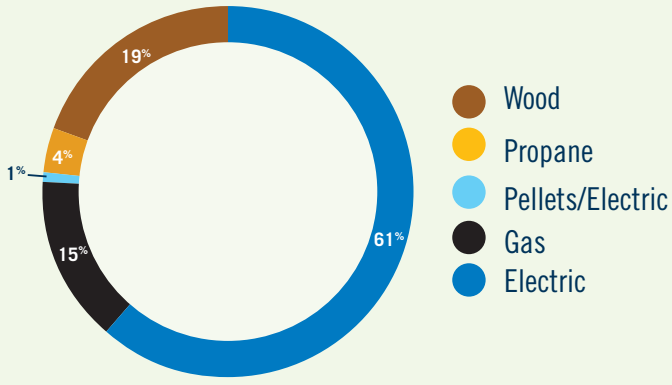
(Single-Family Homes)



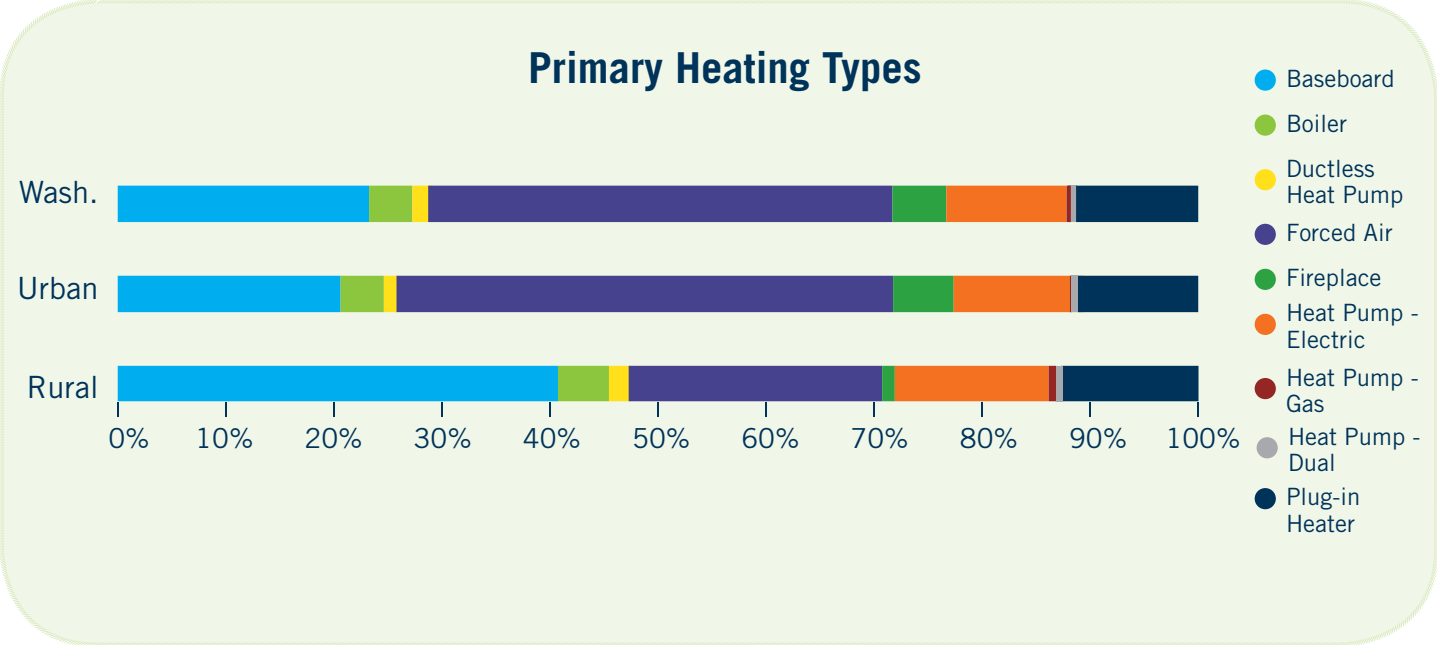
Urban Single-Family Home/ Heating Fuel Type

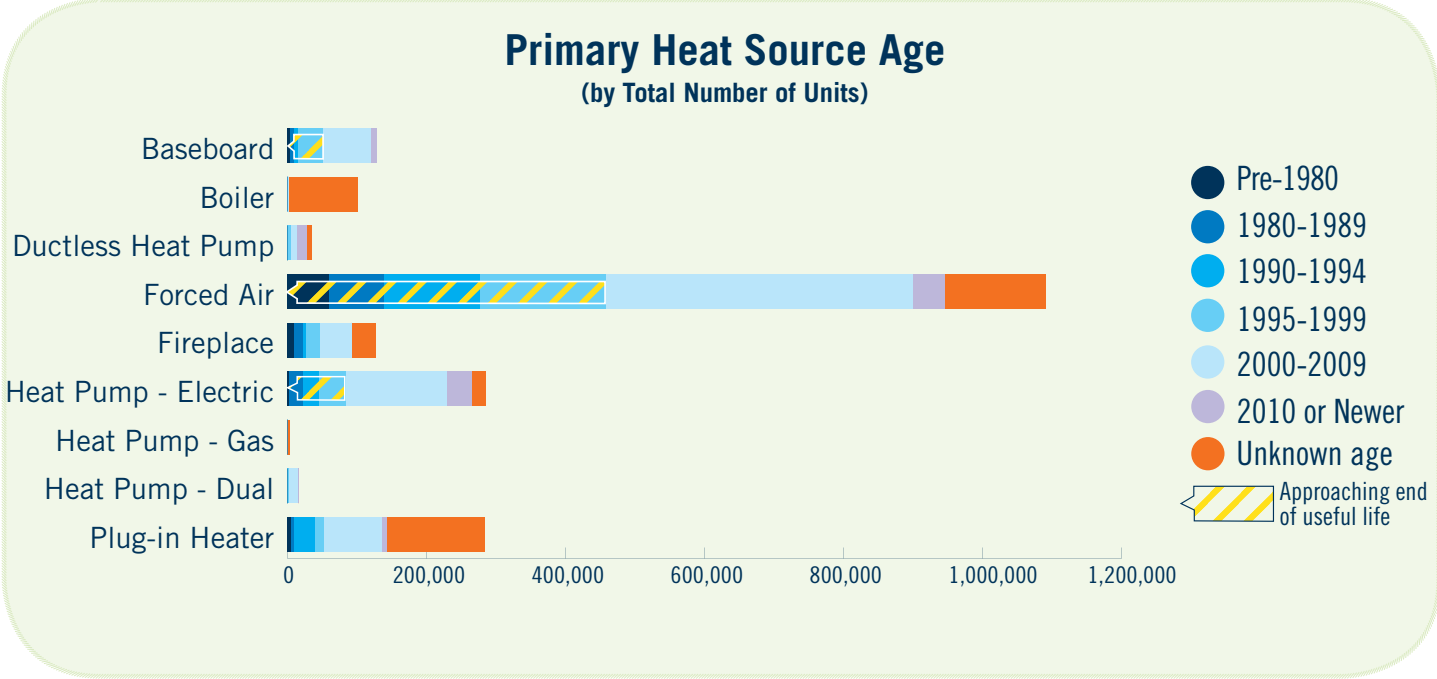


Rural Single-Family Home/ Heating Fuel Type



In urban counties in Washington, the dominant heating type is forced air – both gas and electric (46 percent), followed by electric baseboard heat (21 percent). Electric Baseboard heat is the dominant heat source in rural counties (41 percent). Roughly one-quarter of all forced air units, and only around 12 percent of all baseboard heating units, are at, or nearing the end of their estimated useful lives (15 years and 20 years respectively).

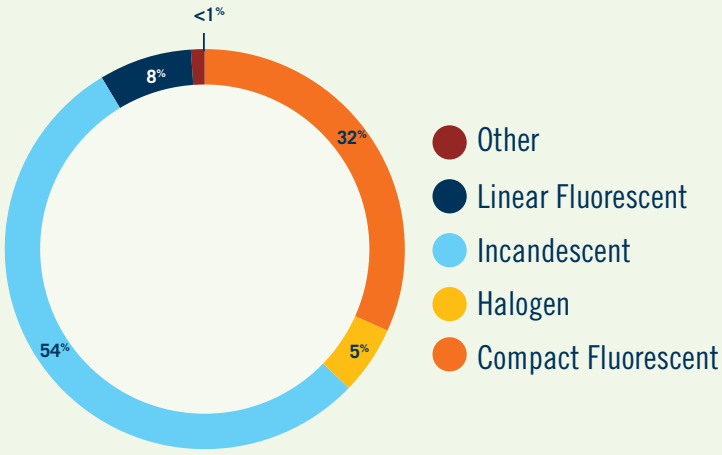




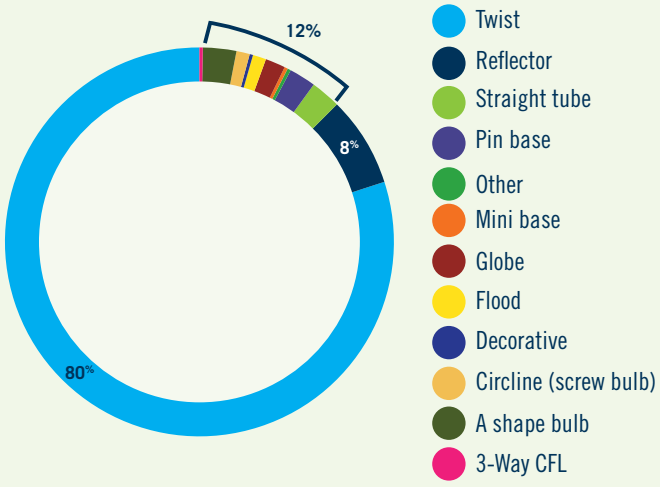
LIGHTING

Compact Fluorescent Bulbs (CFLs) now account for one-third of all Single-Family home lighting in Washington, while incandescent bulbs remain the dominant light source, making up 54 percent of all bulbs. 60W incandescent bulbs are the most populous bulb, making up nearly half of all incandescents (47 percent), and 25 percent of all light bulbs; though total CFLs now outnumber 60W bulbs. Of CFLs, 80 percent are twisted bulbs. LED lights were too new to register before 2012.

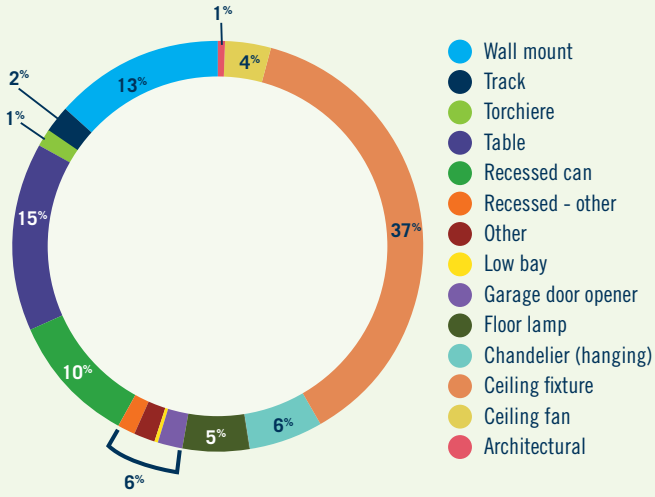
Lamp Type



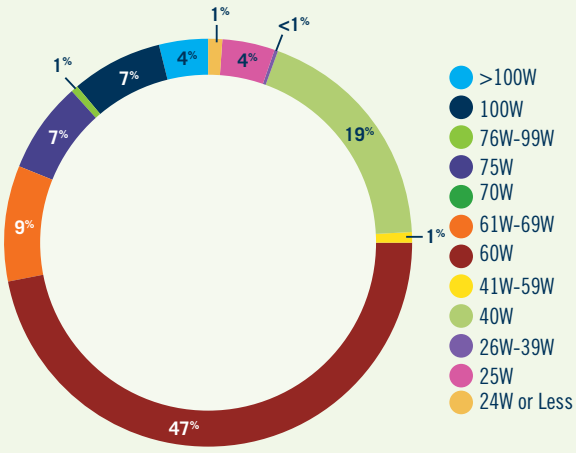
CFL Bulb Type



Fixture Type



Incandescent Wattage



Single Family Home: Lamp Category by Lighting Lamp Type – Total Lamps							
	Compact Fluorescent	Halogen	Incandescent	Linear Fluorescent	Other	Total	% of Total*
3-Way CFL	71,423	0	0	0	0	71,423	0.15%
3-Way Incandescent	0	0	924,568	0	0	924,568	1.99%
A Shape Bulb	415,528	0	0	0	0	415,528	0.89%
Circline (Screw Bulb)	155,519	0	0	0	0	155,519	0.33%
Clear	0	0	873,447	0	0	873,447	1.88%
Colored	0	0	37,678	0	0	37,678	0.08%
Decorative	49,207	0	1,309,472	0	2,079	1,360,759	2.92%
Flood	149,167	0	0	0	0	149,167	0.32%
Fluorescent Other	0	0	0	94,490	2,003	96,494	0.21%
Fluorescent Unknown	0	0	0	26,899	0	26,899	0.06%
Globe	253,642	0	1,639,511	0	0	1,893,152	4.07%
Heat Lamp	0	0	382,910	0	0	382,910	0.82%
LED Interior	0	0	0	0	328,287	328,287	0.70%
Multifaceted Reflector	0	1,044,102	0	0	0	1,044,102	2.24%
Metal Halide	0	0	0	0	9,912	9,913	0.02%
Mini Base	40,358	0	1,630,400	0	0	1,670,758	3.59%
Other	51,690	298,055	257,108	0	62,384	669,238	1.44%
Parabolic Aluminized Reflector	0	774,497	0	0	0	774,497	1.66%
Pin Base	327,738	0	0	0	0	327,738	0.70%
Quartz Tube	0	410,721	0	0	0	410,721	0.88%
Reflector	1,115,365	0	3,301,415	0	0	4,416,780	9.48%
Standard A Lamp	0	0	14,960,000	0	0	14,960,000	32.12%
Straight Tube	340,240	0	0	0	0	340,240	0.73%
T-12	0	0	0	2,393,410	0	2,393,410	5.14%
T-4	0	0	0	117,833	0	117,833	0.25%
T-5	0	0	0	175,428	0	175,428	0.38%
T-8	0	0	0	680,900	0	680,900	1.46%
Twist	11,860,000	0	0	0	0	11,860,000	25.47%
Total	14,829,878	2,527,375	25,316,509	3,488,961	404,668	46,567,389	100%
	31.84%	5.43%	54.37%	7.49%	0.87%	100%	

*Rounded to the nearest tenth

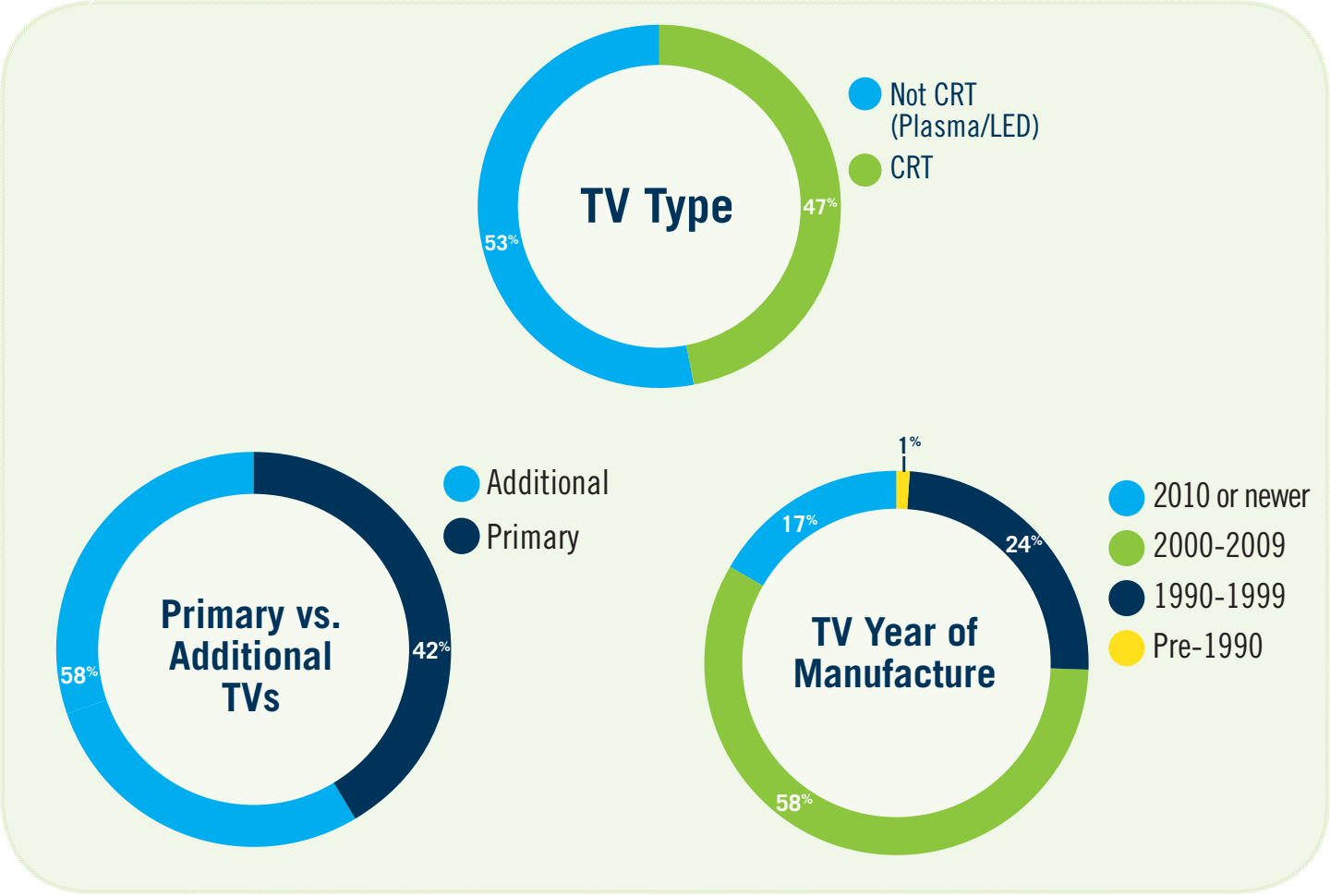
Single Family Home: Lamp Category by Lighting Fixture Type – Total Lamps							
Lighting Fixture Type	Compact Fluorescent	Halogen	Incandescent	Linear Fluorescent	Other	Total	% of Total*
Architectural	54,716	53,071	146,089	90,721	10,562	355,159	0.88%
Ceiling Fan	557,957	8,103	1,115,635	8,167	1,525	1,691,387	4.19%
Ceiling Fixture	6,219,670	398,438	8,204,936	2,598,147	48,673	17,469,864	43.24%
Chandelier (Hanging)	642,602	102,139	1,880,033	0	17,919	2,642,693	6.54%
Exterior	0	0	1,904	0	0	1,904	0.00%
Floor Lamp	3,050	8,244	13,225	1,525	4,956	30,999	0.08%
Garage Door Opener	1,056,109	183,869	1,219,417	35,600	24,610	2,519,605	6.24%
High Bay	106,186	4,956	685,425	2,004	6,421	804,992	1.99%
Low Bay	1,2089	1,464	3,468	87,635	0	104,657	0.26%
Other	0	0	7,765	74,162	0	81,927	0.20%
Recessed - Other	102,042	130,094	332,340	177,088	29,893	771,457	1.91%
Recessed Can	93,058	44,949	402,868	97,023	1,525	639,423	1.58%
Table	1,518,313	501,289	2,692,386	0	101,031	4,813,019	11.91%
Touchiere	2,323,270	257,161	4,145,646	89,936	45,266	6,861,279	16.98%
Track	245,234	142,790	224,932	4,956	11,917	629,829	1.56%
Wall Mount	174,182	421,925	353,141	1,525	32,491	983,264	2.43%
Total	13,108,478	2,258,493	21,429,210	3,268,489	336,789	40,401,460	100%
	32.45%	5.59%	53.04%	8.09%	0.83%	100%	

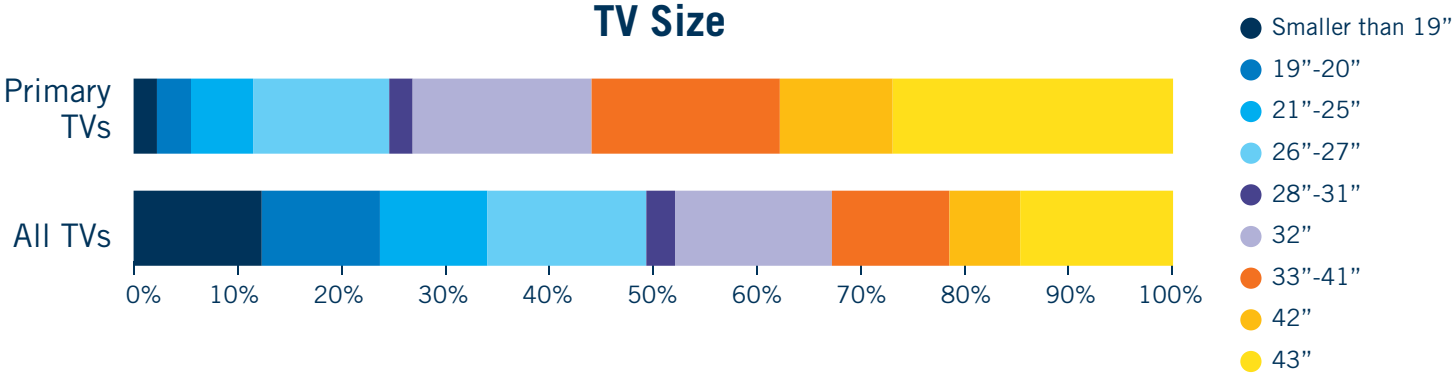
*Rounded to the nearest tenth

MAJOR HOUSEHOLD APPLIANCES

Televisions

TVs in Single-Family homes are split nearly evenly between Cathode Ray Tube (CRT) - 47 percent - and non-CRT (Plasma or LED) – 53 percent. Fifty-eight percent of the TVs in Single-Family homes are not primary use TVs, they are secondary or 'additional' TVs. Seventy-five percent of TVs were manufactured in 2000 or later, with 17 percent made in 2010 or after. The most popular screen size overall is 32". However, while 67 percent of TVs are 32" or smaller, 56 percent of Primary TVs are bigger than 32". On average, primary use TVs are reported to be on for 5.5 hours each day.



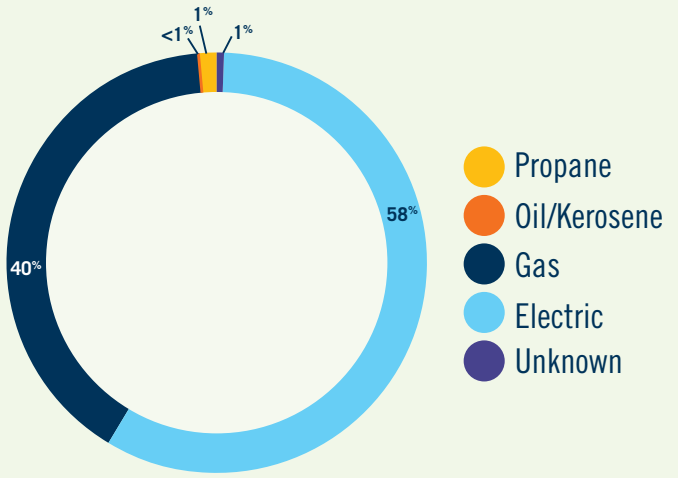


Water Heaters

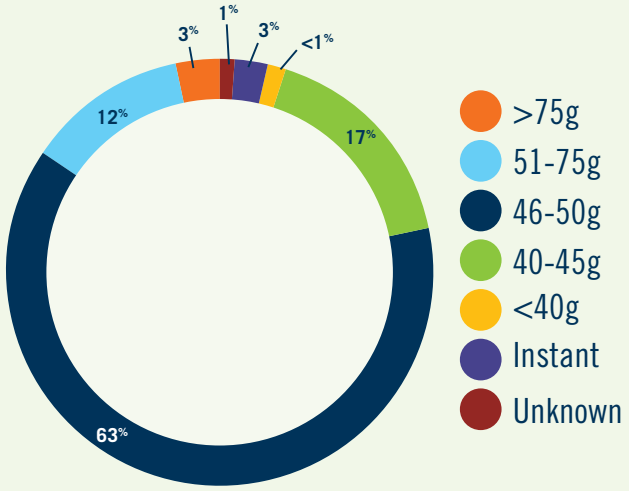
Electric water heaters are more prominent than gas water heaters in Washington Single-Family homes (58 vs. 40 percent). 46-50 gallon water tanks are by far the most common (63 percent), followed by 40-45 gallon tanks (17 percent). Instant water heaters make up three percent of Single-Family home water heaters.

According to Lowes[5], the estimated life expectancy of a water heater is about 8 to 12 years, based on the manufacturer's suggested service life. While life expectancy varies with local weather, unit design, installation quality and maintenance level, 54 percent of electric water heaters and 47 percent of gas water heaters are older than 10 years, and are potential candidates for replacement.

Water Heater Fuel

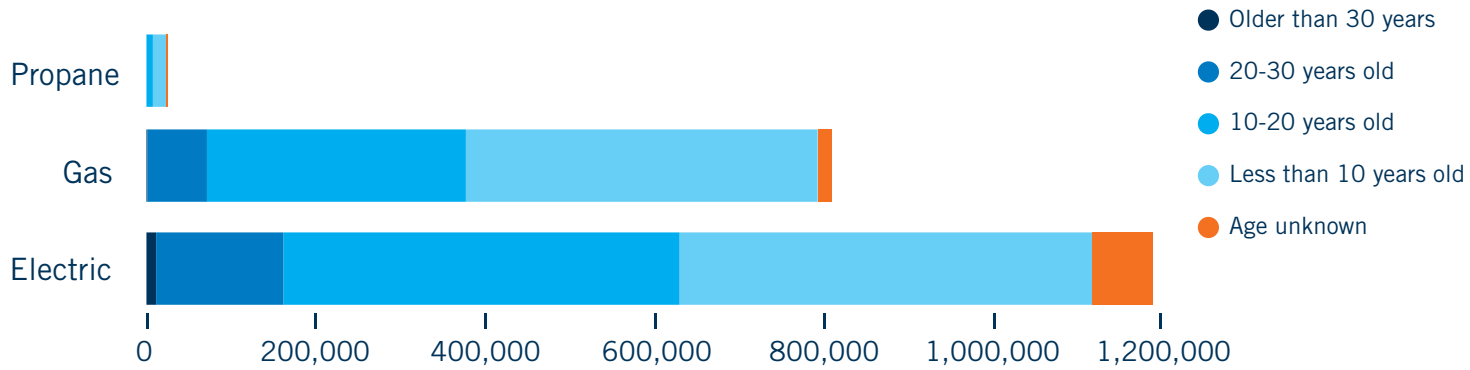


Water Heater Size



Total Water Heater Count

(Fuel Type by Year of Manufacture)

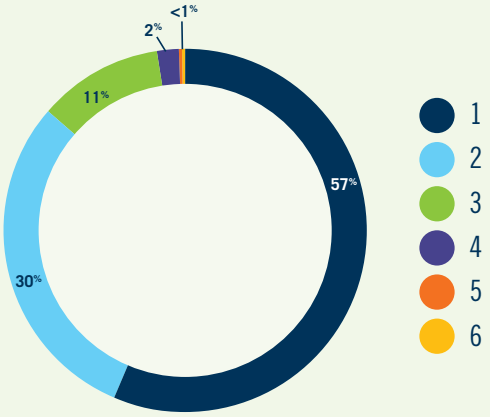


[5]"When to Replace a Water Heater." Lowes Web Site. N.p., n.d. Web. 8 Jan 2014. < http://www.lowes.com/cd_Install a Water Heater_495279775_ >.

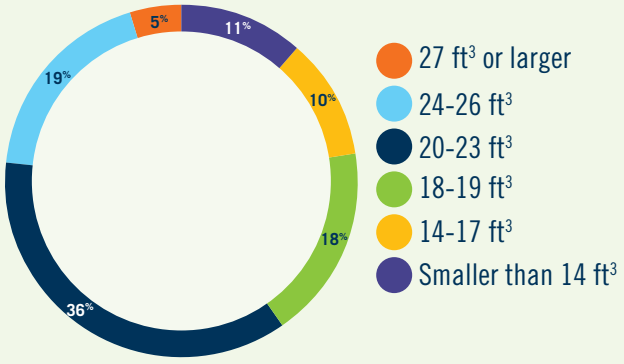
Refrigerators/Freezers

Forty-four percent of Single-Family homes have more than one refrigerator/freezer, which includes refrigerators, freezers, wine coolers, and small refrigerators. About one-third of all refrigerators are 20 to 23 ft^3 (36 percent) and nearly three-quarters are between 28 ft^3 and 26 ft^3. Eighty-five percent of all refrigerators have been manufactured since the National Appliance Energy Conservation Act (NAECA) of 1987, though most were built before 2010. Approximately 1.3 million refrigerators are more than 14 years old - past the estimated life expectancy for refrigerators[6]. Most freezers and refrigerators are single-door upright, but side-by-side models are now nearly as prominent.

Number of Refrigerators/Freezers per Home

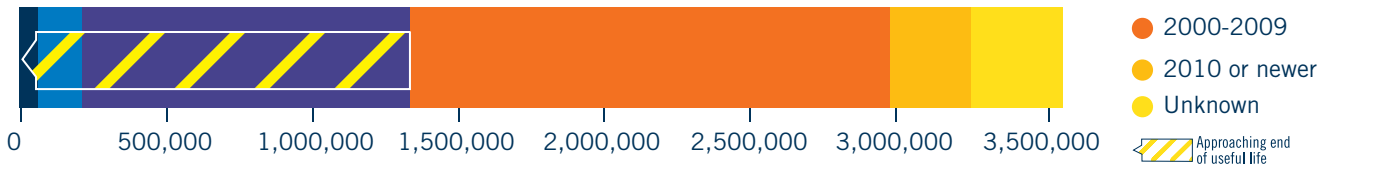


Refrigerator/Freezer Size



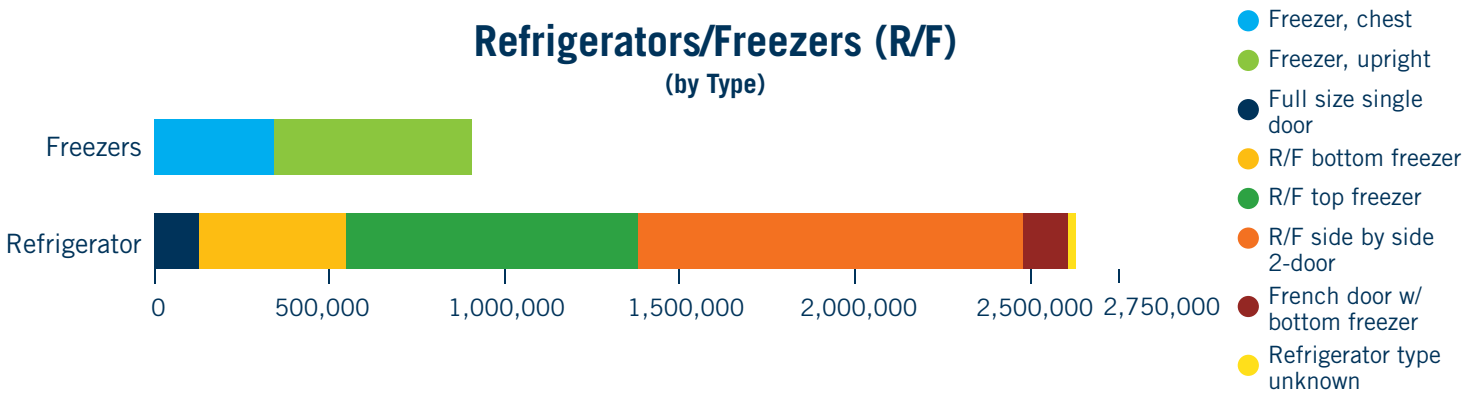
Total Refrigerator Count

(by Year of Manufacture)



Refrigerators/Freezers (R/F)

(by Type)

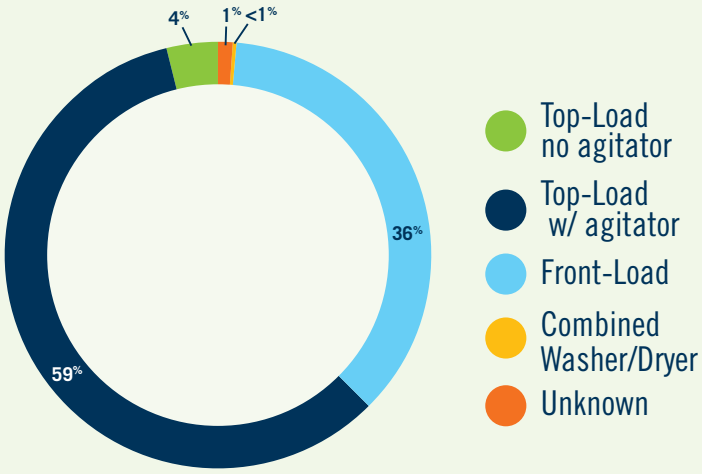


[6] Appliance Statistical Review via http://www.oldhouseweb.com/how-to-advice/life-expectancy.shtml

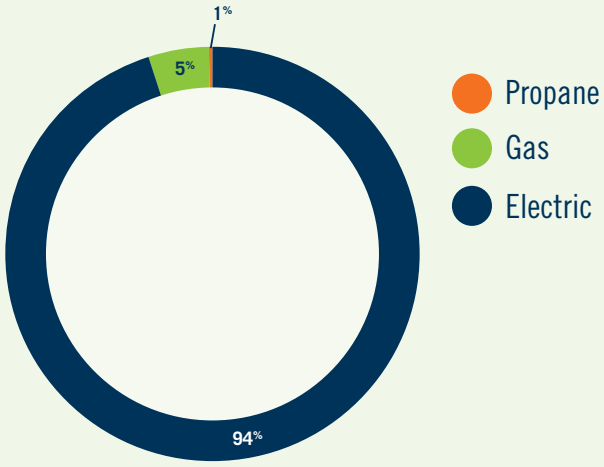
Clothes Washers/Dryers

Top-load washing machines are dominant in Single-Family homes, making up 59 percent of all washing machines. Despite gas being available in a great number of homes and being a popular fuel for heat and hot water, nearly all dryers are electric (94 percent). Dryers tend to be older than washing machines in Single-Family homes. Fifty-five percent of all washing machines and 60 percent of all clothes dryers are older than 10 years. More than 1.2 million dryers and 1.1 million washers are past their estimated normal life expectancies (14 and 13 years respectively).[7]

Washer Type

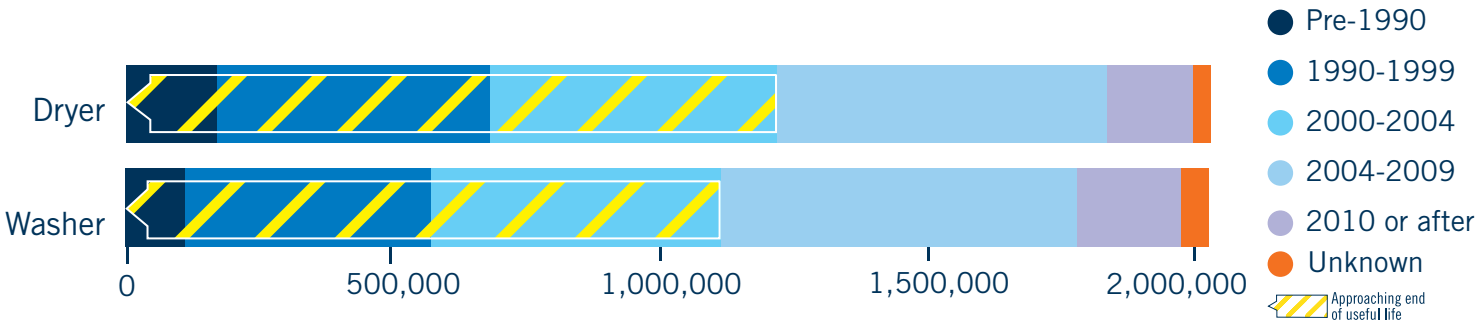


Dryer Fuel Type



Total Washer/Dryer Count

(by Year of Manufacture)



[7]Appliance Statistical Review via http://www.oldhouseweb.com/how-to-advice/life-expectancy.shtml

Dishwashers

Forty-four percent of households (almost 800,000) have a dishwasher older than 10 years – which is past the estimated life expectancy for dishwashers. Most households run three dishwasher loads or less per week.